The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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The Chemistry of Plant Disease

IT happened that some 18 months ago Mr. W. Godden lectured to the Society of Chemical Industry upon "'Trace' elements in human and animal nutrition." His address was commented upon in these columns (THE CHEMICAL AGE, 1939, *40*, 1029, p. 193), and it was there pointed out that element deficiency is to-day the first thing that the agricultural chemist in the tropics looks for when investigating disease. The Imperial Bureau of Soil Science has just issued its Technical Communication No. 39, "The Minor Elements of the Soil" (Imperial Agricultural Bureaux, London, 4s.), a résumé of published literature on the related subject of the effect of inorganic elements, though not necessarily "trace" elements, upon plant diseases. The science of the soil is becoming a highly specialised branch of chemistry and agriculture is taking upon itself the mantle of a scientific industry. We do not presume to say whether this justifies Mr. Bernard Shaw's recent suggestion that agriculture can no longer be conducted by the farmer as has been done for centuries but must be turned over to specialist firms operating over millions of acres with expert staffs; but it does bring home the necessity for intimate contact between science and the farm. Because we believe in individualism in this country, we shall continue to allow the small farmer to till the land as heretofore; but periodical visits from consulting agricultural chemists might do much for British agriculture.

The Bureau points out that the growing volume of literature on the minor elements in the soil is indicative of the importance attached to the subject by agricultural scientists. In its present publication no attempt is made to give an opinion on the frequently divergent views expressed in the literature upon the subjects reviewed, but a valuable synopsis is given of the work and ideas of responsible investigators. Many fresh instances of apparent minor-element deficiency have been noted within the last six years, but the obvious divergency of ideas to be found in the literature shows only too clearly that our knowledge of the actual rôles played by sometimes infinitesimal quantities of certain substances in the metabolism of either plant or soil has not advanced very far. This is, in fact, a yet immature science in which the field for discovery is very large. A review of the evidence and the hypotheses advanced suggests that to regard the simple excess or deficiency of a particular element as the cause of observed disease or fruitfulness may be inadequate. Elements may react upon one another; the presence of water, especially at certain seasons of the year, the past history of the soil, the mode of combination of the elements, and above all the interactions of micro-organisms with the elements and compounds in the soil may either singly or in combination be dominant factors. Micro-organisms may render a specific element unavailable to plants, or the element may effect a desirable or undesirable change in the micro-organic population of the soil. Thus far little has been done to study combinations of factors, though investigators are evidently alive to the possibilities. The time element enters into the investigations, too, for by the nature of things agricultural research must await the seasons for its results to be made known.

Four elements, boron, manganese, copper, and zinc, appear to be essential plant nutrients which are toxic in any but the smallest quantities. Of these, boron presents analytical difficulties so that neither its combinations nor its actual content in soils has been studied to any great extent. Boron deficiency appears to cause, *inter alia*, heart and dry rot in sugar beet and mangolds. How boron deficiency may arise is not altogether understood, but its addition must be carefully undertaken or toxic accumulations may later occur in the soil. Manganese commonly varies from 0.001 to 1.27 per cent. but some tropical soils may contain 15 per cent.; it is one of the most easily exchangeable bases, particularly under acid conditions. Most of the work on this element has been done in connection with the "grey-speck" disease on oats but it affects many other crops as well. Copper, which may amount to 140 p.p.m. but usually does not exceed 20 p.p.m., is used as a cure for the "reclamation disease" long known in Europe. This affects crops grown on land that has been reclaimed from heath and moorland, and it is suggested that copper may stimulate the oxidation of humus, besides serving as a direct plant nutrient. Zinc is believed to be an essential food element, even though only present to the extent of 2 to 50 p.p.m.; it seems to affect fruit trees and corn principally. Space does not permit even a résumé of the essential information contained in this volume, but in addition to the elements just mentioned, there is a summary of work on iron, magnesium, and sulphur which are termed "Minor classical nutrient elements," on iodine and cobalt, deficiencies in which affect the health of animals fed on the vegetation of the district; on selenium and molybdenum which are toxic to animals (especially selenium as Mr. Godden pointed out), and thallium and chromium which are as yet only suspected of deleterious effects on plants.

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NOTES AND COMMENTS

Government Changes

THE reasons of health which have prompted Mr. Chamberlain to resign are universally deplored, and by none more than the business community which gave him unwavering support in the most harassing Premiership which has ever fallen to a British subject. Whether the consequential changes in the Government make for the strengthening of the war effort remains to be proved. Several of them affect departments in hourly touch with industries great and small. Sir Andrew Duncan, a successful industrialist, succeeds Mr. Herbert Morrison as Minister of Supply. He is succeeded at the Board of Trade by a newcomer to the political field, Captain Oliver Lyttelton. Great hopes are centred upon a recruit who, with many political affiliations, has hitherto sought a career in the City of London. Lt.-Col. Moore-Brabazon is probably as well acquainted with national transport problems as any parliamentarian and should be a successful Minister. It must be confessed, however, that very grave doubts are being openly expressed about the setting up of a new Ministry of Works and Buildings with Sir John Reith at its head. The building trade in particular is very critical of the appointment. The idea, apparently, is to have a kind of super-Minister to deal with reconstruction. The trouble is that there are already so many overlapping authorities to put obstacles in the way of any sort of new building that the addition of still another one makes the prospect of orderly reconstruction seem extremely dubious.

Australia Searches for Bauxite

WHILE few of the bauxite deposits known to exist in Australia are believed to be completely suited to the production of aluminium by processes standardised in other countries, war requirements of aluminium demand a more intensive search for this ore. It has been suggested that State Government geologists' departments should be mobilised in an Australia-wide search, states a report in the *Industrial Australian and Mining Standard*. Most known Australian deposits contain silica or iron that might make treatment difficult. Experts believe, however, that it is only a matter of searching to find suitable bauxite. The principal deposits at present known are on the Darling Ranges, in the south of Western Australia, and at Wingello and Emmaville, in New South Wales, and some analyses of the Western Australian deposits suggest that bauxite of sufficiently high aluminium content lies in that State. The Western Australian Government recently stated its intention of making a thorough examination of the Darling Ranges deposits. Plans already in existence for the creation of an Australian aluminium industry provide for the use of imported bauxite from India, Burma, or British Guiana, if local supplies are not obtainable, but it is hoped that later Australian industry may make its own aluminium. Production of aluminium sheets, at least, it is stated, should not be deferred longer than next year.

Static Charge on Chemical Glassware

THE static charge acquired by chemical glassware when wiped may cause a serious error in weighing the vessel, this difficulty being particularly pronounced when the moisture content of the atmosphere is low. For instance, in the Pregl method for the microchemical determination of carbon and hydrogen, the absorption tubes are wiped with a chamois leather. This causes a static charge that leaks off so slowly, when the humidity is low, that the time schedule (usually 10 to 15 minutes) between completing a combustion and weighing the absorption tubes can not be maintained. Van Straten and Ehret state that the charge can be removed by the high-frequency discharge from a device commonly used to detect pinholes in evacuated apparatus. Clement J. Rodden of the Chemistry Division of the U.S. National Bureau of Standards has found that if ultra-violet light is used to ionise the air surrounding a glass vessel the charge can readily be dissipated. In experiments at the Bureau, the vessel was wiped with a dry chamois and was considered to have reached constant weight when the variation was less than 0.05 mg. using a macro-balance. Weighings were made usually after five-minute interval exposure to the light. In some instances the interval was reduced to two minutes. As a safe general rule, it is recommended that the wiped article be placed about two feet from either a Hanovia Alpine Sun Lamp or General Electric Lab-Arc for ten minutes.

Atmospheric Pollution

DESPITE the increasing industrial activity in the years preceding the outbreak of the war, the state of the atmosphere has shown a steady improvement since 1936. This is shown in the Report on the Investigation of Atmospheric Pollution for the year 1938-9. The local authorities making the measurements of atmospheric pollution on which these reports are based have decided to carry on with the investigation if possible, since a knowledge of the state of the atmosphere is of importance even in war-time. Although more urgent tests have delayed its issue, the report on the year's observations has now been issued by the Department of Scientific and Industrial Research.* The seasonal variation of pollution from domestic and office fires is clearly shown by the figures given, while the effect of the pollution in cutting off daylight from the centres of towns is brought out in diagrams. Apart from the work of local authorities, the central Atmospheric Pollution Research Committee was mainly concerned throughout the year under review with a survey of the area in and around the City of Leicester. The diagrams, however, and striking illustrations demonstrate the effect of pollution of the atmosphere on buildings of limestone and sandstone throughout England.

*The Investigation of Atmospheric Pollution, Twenty-fifth Report on Observations in the year ended 31st March, 1939. (H.M. Stationery Office, 2s. 6d.)

NAPHTHENIC ACIDS AND THEIR SALTS*

Varied Applications for Industrial Use

IN the refining of crude petroleum oils, by treatment with sulphuric acid and subsequent neutralisation with caustic soda, sludges are formed. Such products, more or less purified, are variously known as mahogany sulphonates, petroleum sulphonates, naphthenic soaps, and naphthenic acid sludge. The appellation "naphthenic soaps" as applied to such products is not strictly true, and may be misleading, because they are really sodium hydrocarbon sulphonates, for which one refiner gives the empirical formula $C_{22}H_{23}SO_3Na$, with a molecular weight of 440.

The term "naphthenic acids" is used to describe cyclic carboxylic acids occurring in petroleum. Although these acids have been the subject of extensive research, it is problematical whether they have as yet been entirely isolated and identified. However, we do know that crude petroleums which are rich in paraffin (Pennsylvania crudes) have low naphthenic acid content, about 0.1 per cent., and conversely, those which are poor in paraffin (Russian, Rumanian, Venezuelan and Californian) contain considerably more (1 to 3 per cent.) naphthenic acids.

An idea of the potential supply of naphthenic acids may be gleaned as follows: based on a yearly world-wide production of 200 million tons of petroleum, and an average of 0.1 per cent. content of the acids (which is low), there is available for recovery 200,000 tons of acids. Actual production figures are not available, but V. L. Shipp, *Oil and Gas Journal*, March 19, 1936, estimates the Russian production as follows:

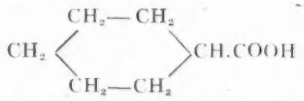
1912	4,000,000 lb.
1928	12,000,000 ,,
1934	35,000,000 ,,

The U.S. Tariff Commission reports that in 1936 514,014 lb., valued at $26,440, arrived at the port of New York, principally from Hungary and Rumania.

In the United States the greater part of the naphthenic acids used are converted into metallic naphthenates for use as paint driers. In many European countries, where fats are scarce, these acids are used to a certain extent in the manufacture of soap.

Properties of Naphthenic Acids

The acids include aliphatic acids of the general formula $C_nH_{2n}O_2$, the $C_nH_{2n-2}O_2$ type, and bicyclic acids of the type $C_nH_{2n-4}O_2$, while G. E. Goheen found acids containing five carbon rings and a molecular weight of 317. The following formula is given for naphthenic acid, (hexahydrobenzoic or cyclohexane carboxylic acid), which has a molecular weight of 128.09:



The acid is described as consisting of transparent tablets or prisms; it is odourless but, when fused, has a valerian odour. It has a sp. gr. of 1.034, melting point 29-30° C., and boiling point 232-3° C. It is slightly soluble in water and very soluble in alcohol, chloroform, ether and benzene. The lower members are colourless liquids when pure, the higher ones are yellowish. They are also soluble in liquid SO_2 but the solubility decreases as the molecular weight increases. They boil from 120° C. at 12 mm. pressure, to 300° C. under 0.1 mm. for the highest components.

In a recognised method of recovery, the crude oil, or distilled fractions thereof, is stirred with concentrated sulphuric acid; 0.5 to 1 per cent. for benzene, 2 to 4 per cent. for kerosene, and 5 to 10 per cent. for lubricating oil. Upon settling, the lower layer, which consists of acid tar, is thrown off and the oily layer is stirred mechanically or with air, with 2 to 5 per cent. caustic soda. The acids, together with some sulphonic acids formed by the sulphuric acid, go into the alkaline layer, which is allowed to precipitate and is later separated. The impurities are due chiefly to the contamination of the soap by the hydrocarbons from the petroleum. The lye is evaporated down, salted out with sodium chloride, and the residue is worked up to sodium soaps of naphthenic acids. The soaps may then be cut with dilute sulphuric acid to isolate the naphthenic acids. These are dark, and of commercial quality.

Current Recovery Methods

By a newer method of recovery, U.S.P. 1,681,657, in which selective solvents and absorbent earths are used, acid tar formation is minimised, and only the alkaline treatment is necessary. The naphthenic acids are obtained by stirring with sodium carbonate, adding alcohol and drawing off the alcoholic extract, and then distilling off the alcohol. Such soap solutions can be freed of oil by evaporation or vacuum distillation. Sulphur dioxide is used in place of sulphuric acid to liberate the naphthenic acids from the soap. The alkali can then be regenerated from the sodium sulphite with quicklime.

To obtain pure naphthenic acids the method of Spitz and Honig may be used. In this process, the impure acids are esterified with methyl alcohol, and the mixture of esters washed with alkali and distilled. The distillate is then saponified with caustic soda and extracted repeatedly with petroleum ether. The process is then repeated. Even this does not always remove the last traces of impurities.

Naphthenic acids have an unpleasant odour, and even when purified, and allowed to stand, the original odour returns. They are only slightly toxic to human beings, but they possess powerful bactericidal properties, as do their metallic salts. Although some investigators have found that naphthenic acid soaps do not lower the interfacial tension between oil and water as much as do the palmitates, nevertheless the naphthenates are more effective in producing oil-in-water emulsions. Naphthenic soaps have a higher solvent power for hydrocarbons and give less foam than the palmitates.

Minich and Lewison found that sodium, potassium and triethanolamine soaps prepared from purified naphthenic acids are appreciably less alkaline in reaction than other soaps. Their aqueous solutions even in high concentration do not gel. They are excellent emulsifying and strong wetting-out agents and good detergents, and possess marked germicidal and fungicidal value. They do not salt out readily, nor do they oxidise readily, and consequently will not develop rancidity. Equal parts of carbon tetrachloride, cyclohexanol and sodium naphthenate make a good dry cleaner's soap. A reaction between sodium naphthenate and alumina is employed for sizing cardboard. By polymerisation, the aluminium naphthenate formed hardens to an undetachable elastic film.

Naphthenates of ammonium and of the alkali metals are readily soluble in water, but the magnesium, calcium and barium salts are more sparingly soluble. A solution of calcium naphthenate in oil increases its viscosity, and this property is sometimes made use of in lubricating oil. The calcium salt is likewise used as a catalyst in the production of fatty acids, in catalytic oxidation of petroleum.

The aluminium and heavy metal salts are insoluble in water and alcohol, and can, therefore, be obtained by precipitation with the salts of the metal concerned, from alkali naphthenate solutions. Aluminium naphthenate may be used as a delustring agent for rayon. It will produce paint with any desired flatness, higher solid content, lower penetration and easier brushing. A viscous liquid is formed by dissolv-

* Adapted from a paper by Benjamin Levitt, F.A.I.C., in *Chemical Industries*, 1940, *47*, 2, 166-7.

ing 10 per cent. aluminium naphthenate in solvents. U.S.P. 2,186,750 describes an alkaline aluminium naphthenate, or naphthenic ester dispersion, insoluble in water, and a stable waterproofing dispersion of rubber, for impregnation of jute fabrics, to waterproof and to proof against deterioration by fungi and moulds.

Manganese salts are pink; ferrous salts, green; ferric salts, reddish-brown; chromium salts, violet and green; and copper salts green. Manganese, cobalt and lead driers are produced from vacuum-distilled naphthenic acids, by methods of precipitation and fusion. These salts are also used for insulating materials, adhesives, and varnish substitutes. Lead oleonaphthenate is used in non-chatter oils. Tin naphthenate, according to Br. P. 398,222, is used in non-sludging motor oils.

Copper naphthenate is soluble in naphtha, toluol, turpentine and other organic solvents and finds uses as an insecticide. It makes a good anti-wrinkling agent for synthetic enamel, improves gloss and adhesion, and is a good anti-skinning agent when used to the extent of 0.03 to 0.3 per cent. A 20 per cent. solution of copper naphthenate in petroleum spirits is recommended for dry rot.

Cerium naphthenate is an excellent drier, but because of its change of colour with change in valency, it cannot be used in white paint. It is used chiefly in high grade varnish. It is used also as a waterproofing for impregnation of rope and sails. In printing ink, cerium naphthenate prevents too great absorption of the ink by the paper. It produces stronger films than those of lead, cobalt and manganese. Zinc naphthenate imparts thixotropic properties to paint, facilitating grinding and dispersion. Zirconium naphthenate is formed by heating mixtures of naphthenic acid with zirconium sulphate. It is an amber-coloured, transparent heavy liquid, with a consistency of heavy lubricating oil. It possesses no drying quality, but may be used as an anti-chalking agent and also as an ingredient of pottery glaze and enamels.

Glycerol esters of naphthenic acids are used in the manufacture of lacquer and wetting agents. When naphthenic acid anhydride or its esters are subjected to catalytic hydrogenation at 10 atm. and above 200° C., naphthenyl alcohol is produced. Treatment of the alcohols of the higher molecular weights with sulphuric acid or chlorosulphonic acid leads to the formation of sulphonic acids with detergent properties. Substitution of OH by halogens produces halides, which may be used as a basis for further synthesis.

Naphthenic resin, according to Fr.P. 827,203, is produced by esterifying 1 mole of naphthenic acid with 1 mole of glycerine and 2 OH groups are caused to react with maleic, adipic, succinic, phthalic or other dibasic acid. Harder resin may be produced with maleic acid anhydride and less naphthenic acid. When a mixture of octyloxyacetic and naphthenic acids is treated with manganese chloride and sodium acetate in the presence of toluene, a manganese complex in the form of a yellow resin is formed.

The Workmen's Compensation Act, 1940

Total and Partial Disablement Provisions

UNDER the principal Workmen's Compensation Acts, the weekly payment for total disablement is one-half of the average earnings of the employee, but no such payment can exceed 30s. a week; that is, where the earnings were 50s. or more a week. If the average earnings were less than 50s., the weekly payment is one-half, plus a further amount equal to half the difference between the weekly payment and the sum of 25s. or the average earnings, whichever is the less. In the case of a worker earning 40s., the weekly payment is 20s. (one-half) plus half the difference between that 20s. and 25s. (being less than 40s.), or 2s. 6d., making a total payment of 22s. 6d. weekly.

For partial disablement, the weekly payment for the "50s. weekly" class is half the difference between pre-accident and post-accident earnings; for the "under 50s." class the percentage is not one-half of the difference, but the same proportion as the weekly payment for total disablement bears to the average earnings. If, for example, pre-accident earnings were 40s. and total disablement payment 22s. 6d. (as above), the proportion here is 56¼ per cent. Then, if post-accident earnings are assumed to be 20s., a difference of 20s. (20s. from 40s.) results; the partial disablement payment will thus be 56¼ per cent. of 20s., or 11s. 3d.

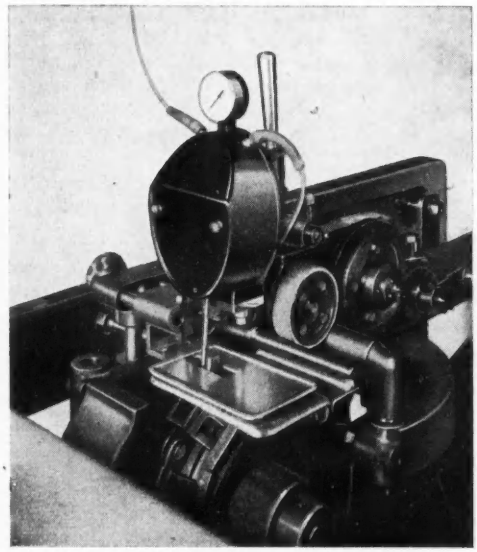
The Workmen's Compensation (Supplementary Allowances) Act, 1940, increases these amounts by a supplementary allowance of 5s. weekly, and if the case concerns a male worker further supplementals are provided for any children under fifteen years old, the rate being 4s. for each of the first two children and 3s. for every other child. The foregoing rates apply to total disablement; but for partial disablement the supplementals will be the proportion the partial disablement payment bears to the payment applicable for total disablement. Taking the same example as above, the total disablement payment is 22s. 6d., the partial disablement rate 11s. 3d., or 50 per cent. of the former; in such cases the supplemental rate would be 2s. 6d., 2s. and 1s. 6d., respectively, instead of 5s., 4s. and 3s. as above. The full amount payable, however, *i.e.*, weekly payment plus any supplemental cannot exceed seven-eighths of the average pre-accident earnings. That is for total disablement; for partial disablement the limit is seven eighths of the difference between pre-accident and post-accident earnings.

Where death results from the injury, the compensation is by lump sum payment and this new Act does not affect the calculation of this lump sum, but the following should be noted. If death does not immediately result and weekly payments have been paid for the period between the date of the accident and date of death, the amount of these is deducted from the lump sum payable to the dependants. But any supplementals included in the weekly payment are not to be deducted, and the new Act makes clear that only the ordinary weekly payments will be deducted. Moreover these supplementals will not apply where the question of Health Insurance sickness or disablement benefit arises; roughly, if W.C.A. weekly payments are more than Health Insurance benefit, no H.I. benefit is payable, and if less, then only the difference is payable to bring up to the H.I. benefit rate.

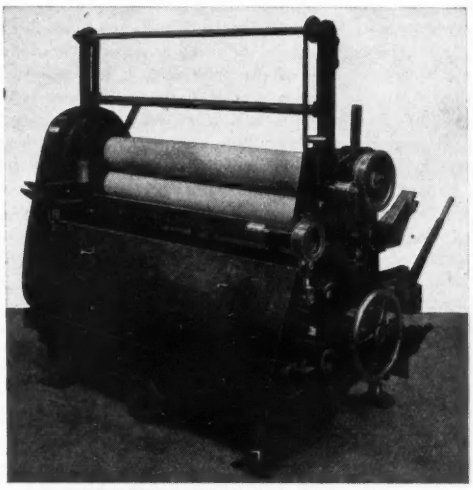
Under the main scheme weekly payments can be redeemed for a lump sum, but the judge can refuse to sanction such action if he considers it inadequate or that the agreement has been obtained by improper means. This provision is unaltered as regards ordinary weekly payments, but as regards any supplementals payable, the judge is empowered to refuse sanction for these to be taken into account as regards a lump sum, if he is satisfied after considering all the circumstances of the case, including the interests of any children for whom allowances are payable, that it would be best for the supplementals not to be redeemed. Consequently there may be cases where the ordinary weekly payments are redeemed, but the supplementals under this Act will continue payable.

The new Act applies where the accident occurred before or after August 19, 1940, but not to accidents which occurred before January 1, 1924; these pre-1924 cases come under the scales provided by the War Additions Acts of the last war.

NEW TEXTILE PROCESSING ACCESSORIES



Hydraulic Guider Head on Pin Stenter.



Light Portable Padding Mangle.

UNDER the above head we published a page of pictures of some recent developments in textile processing machinery in our issue of September 28. In Mr. Ranshaw's article which those illustrations accompanied, mention was made of hydraulic mechanism manufactured by John Dalglish and Sons, of Glasgow. Owing to the difficulties of printing and communications these days, the means to illustrate these new developments became available to us only a few days ago. Messrs. Dalglish went to considerable trouble to provide the necessary material, and we have no hesitation in asking our readers' indulgence for publishing the above illustrations after a fortnight's interval.

Fluorescent and Phosphorescent Paints

New British A.R.P. Standards

THE British Standards Institution has recently published a revision of BS/ARP 18, Fluorescent and Phosphorescent Paints for A.R.P. Purposes. This specification was originally published in December, 1939, and is one of a large number for A.R.P. purposes published at the request of the Ministry of Home Security by the Institution since the outbreak of war.

The main points of difference between the latest issue of the specification and the earlier edition are the extension of the specification to cover paints other than those giving a greenish light and the inclusion of a simpler form of brightness test as an alternative to the visual brightness photometer method. The latter, it was always realised, has proved difficult for laboratories not specially equipped for the work of measuring brightness of the order of 0.001 equivalent foot-candle. Another interesting feature is the adoption for the purposes of this specification of a unit referred to as effective brightness which takes the place of the more usual unit of equivalent foot-candle. The unit of effective brightness is defined in the specification as follows:—

Unit of Effective Brightness. A unit of brightness in common use is the equivalent foot-candle which is defined as the brightness produced by an illumination of 1 foot-candle on a perfectly diffusing surface having a reflection factor of 100 per cent., comparisons of differently coloured surfaces being made at values of brightness sufficiently high to ensure that the observer's eye is in a state of light-adaptation.

Owing to the fact that at low brightness the eye becomes progressively more and more blue-sensitive, the judging of the merits of differently-coloured luminescent paints on the basis of their equivalent foot-candles does not give a true measure of their relative practical usefulness. It is necessary, therefore, in measurements of coloured light made at brightness of less than 1 equivalent foot-candle, to define precisely the basis of such measurements. The basis adopted in this specification is visual comparison of any surface with a white diffusing surface illuminated by light from a tungsten filament lamp, operating at a colour temperature of 2360° K., the brightness of the white surface in equivalent foot-candles being defined as the product of its reflection-factor ρ and its illumination in foot-candles. This illumination is found by dividing the candle-power of the lamp (I) by the square of the distance of the lamp from the surface, in feet (d). The brightness of the white surface is, therefore, $\rho \frac{I}{d^2}$ equivalent foot-candles, and any coloured surface, judged by a normal observer to be equally bright, is said, for the purposes of this specification, to have an effective brightness of $1000\left(\rho\frac{I}{d^2}\right)$ units, provided that the areas of the surfaces compared subtend an angle of at least 5° at the observer's eye. It will be seen that the unit of effective brightness thus defined is equal to 0.001 equivalent foot-candles for light having a colour temperature of 2360° K.

The unit of effective brightness may be stated in terms of other units, for light having that temperature, as follows:—

1.0 unit of effective brightness is equal to
- 0.001 equivalent foot-candles.
- 0.001 foot-lambert.
- 0.001076 millilambert.
- 0.000318 candles/sq. ft.

A New Rubber Substitute

Development and Uses of "Chemigum"

A BRIEF summary of the steps leading up to the manufacture, on a semi-commercial scale, of a new rubber-substitute elastomer, entitled "Chemigum," by the Goodyear Tire and Rubber Co., is included in the September 10 issue of the *News Edition* of the American Chemical Society. Out of the study of over 300 elastomers, a "short list" of ten was selected; another year's work was spent on the production of enough of these ten materials to determine their respective values, and finally the most suitable of the ten was chosen as the type of commercial product required by the rubber industry. Special attention had to be paid to the physical characteristics of the material in order to adapt it to normal factory procedure and thus avoid the wastage of valuable plant already in existence. Some notes are appended giving an idea of the chracteristics of "Chemigum."

In appearance it resembles brown crêpe rubber; it is quite tough and has a rather distinctive odour. It differs from ordinary rubber in that it is much less soluble in the conventional rubber solvents. In fact, it is so good in its resistance to them that some of the first commercial uses of the material were in articles such as petrol hose, hydraulic brake sealing rings, and similar places where "Chemigum" came in contact with petrol or oil and where dimensional changes could not occur. These uses allowed the semi-commercial production of the product to be instituted in fields where the relatively cheaper price of crude rubber did not offer competition. Apparently one of the immediate fields which is to yield volume business on "Chemigum" is that in which the natural product will not fulfil the requirements laid down. As to physical characteristics such as tensile strength, abrasion resistance, ageing resistance, and resistance to sunlight, an accumulation of data indicates a product equal or perhaps superior to the natural product. Tyres have been made employing nothing but "Chemigum" as the carcass and tread stocks, and these have been found to give road performance equal to or exceeding that obtained from tyres made from the natural product. Petrol hose has been used continuously for more than three years—quite a phenomenal record.

These and other experiences lead the makers to believe that the ability of "Chemigum" to fulfil the need placed upon it by the national emergency is fairly well answered. The problem now is rapidly to expand production from a few thousand pounds a week to many thousand pounds a day.

A Chemist's Bookshelf

CONVERSION OF PETROLEUM. By A. N. Sachanen. New York: Reinhold Publishing Corporation. London: Chapman and Hall. Pp. 413. 36s.

This is a comprehensive work on petroleum technology devoted to the fundamental principles and practices of converting petroleum products into lighter boiling hydrocarbons of which petrol is the principal. A number of new ways have been introduced in recent years for carrying out this conversion. Thermal cracking retains its position and is still the most important of these processes, but catalytic cracking, hydrogenation, polymerisation and alkylation have all become practical methods, the importance of which will increase, particularly since they are of special use in the production of high-octane fuels. The literature on this subject is now becoming enormous and chemists who specialise in the paraffin hydrocarbons will be grateful to Dr. Sachanen for thus summarising the existing information on the theory and practice of old and new processes.

The chemistry of the processes, both in their physical and structural organic aspects, is given prominence throughout this book which is conceived on the best scientific lines. The practical methods by which the processes are carried into effect are also described clearly with the aid of 56 illustrative diagrams. The book commences by describing the general thermal and catalytic reactions of the hydrocarbons, including the paraffins, the olefines, the naphthenes and the aromatic hydrocarbons. The fundamental factors of cracking are then discussed, including the effects of temperature and pressure, the reactions that occur during cracking, and the thermal conversion of gases. This last is a high-temperature process similar to that of the ordinary cracking of liquid petroleum products, but effecting the reformation of the low-molecular-weight hydrocarbons by polymerisation and condensation to form petrol. Some attention is also paid to the production of aromatic hydrocarbons, which was the subject of a recent article in THE CHEMICAL AGE. The commercial applications of cracking are also considered in this chapter.

The third chapter deals with the hydrogenation of petroleum products, which is generally effected at 400° to 560° C. and in the presence of hydrogen at moderate or high temperatures. This phase of the subject is closely allied to the hydrogenation of coal, upon which so much work has been done in this country, and there are many references to the work of Dr. King and his colleagues at the Fuel Research Station. For the most part, however, Dr. Sachanen keeps to the hydrogenation of petroleum products. In the petroleum industry hydrogenation is used for the conversion of heavy refinery residues into petrol and gas oil, for the conversion of low-grade lubricating oils into high-grade lubricating products, and for generally up-grading low-grade oils.

The fourth chapter is occupied with a chemical description of cracking equipment clarified by simple flow diagrams and giving a good deal of valuable practical information. The properties of cracked petrol are considered in the fifth chapter, and the chemical treatment of these fractions is described in a following short chapter. The book ends with the general description of cracked products other than petrols: gases, recycle oils, high-boiling cracked distillates, residues, asphalts and coke.

The book provides a comprehensive treatment of this important branch of petroleum technology and can be thoroughly recommended both to the petroleum industry and to organic chemists anxious to learn something of the theory and practice of the new chemistry of hydrocarbons which the researches of petroleum technologists have opened.

ELEMENTARY LABORATORY EXPERIMENTS IN ORGANIC CHEMISTRY. By Roger Adams and John R. Johnson. London and New York: Macmillan. Pp. 420, 8s. 6d.

This laboratory manual will be very useful for teachers as well as for students in organic chemistry, whether they are specialising in chemistry proper or in related fields. Eight experiments give an understanding of the more important manipulations and procedures, and sixty further experiments deal with the preparation and reactions of typical organic compounds. Each experiment is described in great detail, extending even to specifying the amount of washing or drying reagent to be used in each instance and the exact strength of any reagents used. The questions at the end of each experiment are designed to determine whether the principles and the significance of the experiment performed have been well understood. Many illustrations show the common apparatus used in organic chemistry, with many tables and with instructions in case of accidents and of severe burns. An original and practical feature of the manual is that the pages have been perforated so that, if desired, the experiment sheet may be removed and attached directly to the note-book.

The latest issue of the Wild-Barfield Heat-Treatment Journal—described as an economy issue and published by WILD-BARFIELD ELECTRIC FURNACES, LTD., Watford—contains articles on Nitriding of Steels, Maintenance of Heat-Treatment Equipment and the Spekker Steeloscope.

Owing to the present situation, the September issue of *Alloy Metals Review*, published by HIGH SPEED STEEL ALLOYS, LTD., Widnes, is confined to short abstracts only.

Methyl Vinyl Ketone Resins

Products of Controlled Polymerisation

ALTHOUGH less widely known than the polyvinyl chlorides and polyvinyl acetates, the resins derived from methyl vinyl ketone have nevertheless attracted much attention in recent years. In the pure state the monomer is a colourless and intensely lachrymatory liquid boiling at 80° C. Some interest in its commercial possibilities had been developed before the rise of the synthetic resin industry, as evidenced by the Bayer Company's process of manufacture patented in 1909 [G.P. 222,551 (U.S.P. 989,993)] and consisting in distillation of ketobutyl alcohol with zinc chloride. About a decade ago the cheaper process from acetylene by way of monovinyl acetylene was discovered in the Du Pont laboratories (U.S.P. 1,967,225). Water readily adds on to monovinyl acetylene in presence of various catalysts. Mercury salts were originally used, but more recently good results have been obtained with dihydroxyfluoboric acid as catalyst. An 80 per cent. yield of methyl vinyl ketone was reported (Br.P. 463,545; Du Pont) when a stream of monovinyl acetylene was passed into a mixture of 100 parts acetic acid, 1 part mercuric oxide and 1 part dihydroxyfluoboric acid. After neutralising with sodium acetate, the resultant mixture of methyl vinyl ketone and acetic anhydride could be fractionated.

Crude methyl vinyl ketone may contain a high proportion of water, and it was originally proposed to eliminate this by salting out with potassium carbonate. The drawback of this method is the rapid polymerisation of methyl vinyl ketone in presence of alkali. An improved procedure, which dispenses with the use of alkali, employs a stream of unsaturated aliphatic hydrocarbon to drive off the methyl vinyl ketone from its aqueous solution (Br.P. 502,813); U.S.P. 2,158,290; F.P. 827,141). Another common impurity in crude methyl vinyl ketone is diacetyl, which imparts a yellow colour. It can be eliminated by heating for some time with an inert diluent such as toluene (Br.P. 505,559; I.G.)

Premature polymerisation of methyl vinyl ketone can be avoided by the well-known method of adding a small percentage of an antioxidant like hydroquinone. The same purpose is achieved by a trace of a water-soluble aliphatic acid. It is thus possible to distil methyl vinyl ketone without polymerisation at ordinary pressure (reduced pressure is undesirable) in presence of 0.3 per cent. acetic acid (Br.P. 498,634; F.P. 832,255; I.G.).

The controlled catalytic polymerisation of methyl vinyl ketone results in a series of resins of versatile character. Rubber-like materials have also been isolated. Polymerisation is catalysed by agents like ozone and benzoyl peroxide and is accelerated by exposure to heat and ultra-violet light. Recent work by Melville, Jones, and Tuckett (*Chemistry and Industry*, 1940, 267-72) suggests that free methyl or vinyl radicals may activate the polymerisation of methyl vinyl ketone.

Benzoyl Peroxide as Catalyst

Benzoyl peroxide is one of the most convenient catalysts. A light brown odourless resin was obtained when a solution of methyl vinyl ketone in an equal weight of ethyl acetate was held for 3 hours at 75° C. (*i.e.*, just below the boiling point of the monomer) in presence of 5 per cent. benzoyl peroxide (U.S.P. 2,088,577; Du Pont). The heat developed during the reaction necessitates the use of a refrigerated condenser. A hard transparent resin is likewise formed on exposing methyl vinyl ketone in the absence of a catalyst to sunlight for two days. All these resins are soluble in organic solvents and compatible with nitrocellulose, phenolic resins, and alkyd resins (including drying oil-modified types). In themselves they have given encouraging results when tested as adhesives, *e.g.*, for leather to leather, rubber to steel or stone, cellulose acetate to glass. Gramophone records moulded from polymerised methyl vinyl ketone filled with diatomaceous earth exhibit sound characteristics superior to those of standard shellac records. The resistance of polymerised methyl vinyl ketone resins to discoloration by sunlight indicates their possible utility in white oil and cellulose enamels.

Certain improvements in quality results from copolymerisation of methyl vinyl ketone with other vinyl compounds. The copolymer from 3 parts of the ketone with 1 part of vinyl chloride has greater toughness and elasticity.

Interesting data on the catalytic polymerisation of methyl vinyl ketone with particular reference to the isolation of rubber-like materials have recently been published. A solution in an equal weight of ethyl alcohol was exposed to sunlight until a thick syrup had formed. This was treated with more alcohol, when a rubbery polymer was precipitated (U.S.P. 2,196,714; B.F. Goodrich Company). Similar rubber-like materials were produced by exposing an acetone solution of the ketone to ultra-violet light in presence of a silver, copper or mercury catalyst. Closely resembling masticated natural rubber in respect of plasticity, the new materials nevertheless offer the advantages of greater resistance to solvents and alkalies.

Start of the Purchase Tax

Explanatory Notice Published

THE Treasury have made an Order under Section 18 of the Finance (No. 2) Act, 1940, specifying October 21, 1940, as the date on which the Purchase Tax comes into operation. The Order will be submitted to Parliament for approval in accordance with the provisions of the Act. It is published by H.M. Stationery Office as Statutory Rules and Orders, 1940, No. 1771. All goods chargeable with Purchase Tax which are delivered under chargeable purchases on and after that date are subject to the tax.

In view of the difficulties experienced by traders, the Commissioners of Customs and Excise are still prepared to accept applications for registration. Manufacturers and wholesale merchants who are liable to registration but have not yet registered are urged to do so forthwith. Attention has already been drawn in the Press to the fact that continued failure to register involves penalties and does not free registrable businesses from liability to pay the tax as from October 21.

The Commissioners of Customs and Excise have prepared a further Notice (No. 77) dealing with accounting procedure and returns and other administrative arrangements necessary in connection with the Purchase Tax. A copy of this notice (like the official lists issued a few days ago of goods liable to the tax) will be sent to every firm registered under the Act. Further copies may be had on application to the local Officer of Customs and Excise or to the Custom House, London, E.C.3.

FORMATION OF BIEUGENOL

During an examination of commercial geraniol derived from Java citronella oil, Howard A. Jones and H. L. Haller discovered the presence not only of eugenol (a known constituent of the citronella oil) but also of a gelatinous precipitate which proved to be a zinc salt of bieugenol. The zinc was traced to the galvanised drums in which the geraniol was stored, and the bieugenol is believed to have resulted from the oxidation of eugenol. The formation of the insoluble zinc salt was promoted by heating, and further information is now sought as to whether the zinc or other impurities in the commercial geraniol played any part in the formation of the bieugenol (*J. Am. Chem. Soc.*, 1940, 62, 2558). Eugenol in the last war was found to be of service in preparing plastic and transparent varnishes, of cellulose acetate base, for covering the wings of aeroplanes.

PERSONAL NOTES

DR. NORMAN S. GRACE, F.C.I.C., was recently appointed chief chemist, Dunlop Tire and Rubber Goods Co., Ltd., Toronto, following the resignation of Mr. L. D. Carver. Dr. Grace has been associated with the Dunlop Tire and Rubber Goods Co. for the past year and a half. He has had considerable previous experience in the rubber industry, having spent some years with Gutta Percha and Rubber, Ltd., Toronto, and two years with the National Research Council at Ottawa, where he worked under Dr. G. S. Whitby. He graduated in chemistry from the University of Saskatchewan in 1927, and he has held a Beit Research Fellowship in London (where he has done research work at the Imperial College of Science, leading to a Ph.D. degree), and a Commonwealth Fund Fellowship at California.

SIR ANDREW RAE DUNCAN, G.B.E., who has vacated the presidency of the Board of Trade to become Minister of Supply, in place of Mr. Herbert Morrison, now Home Secretary, is well known in the metallurgical industry, being chairman of the executive committee of the British Iron and Steel Federation. He has done valuable work at the Board of Trade and his organising and administrative abilities should likewise find full scope in his new appointment.

Aged 56, Sir Andrew was created a knight in 1921. He is a director of the Bank of England and a member of the Central Electricity Board, of which he was chairman from 1927 to 1935. He is also a member of the Economic Advisory Council. Coal Controller from 1919 to 1920, he was chairman of the Advisory Committee of the Coal Mines Department from 1920 to 1929 and was chairman of Royal Commissions in 1925 and 1932 to inquire into the coal industry in Nova Scotia. He was High Sheriff of the County of London from 1939 to 1940 and is one of H.M. Lieutenants for the City of London.

Sir Andrew Rae Duncan, G.B.E.

CAPTAIN OLIVER LYTTELTON, D.S.O., M.C., whose appointment as President of the Board of Trade, in succession to Sir Andrew Duncan, was announced last week, is managing director of the British Metal Corporation, Ltd., and prior to his new appointment had been Controller of Non-Ferrous Metals since the outbreak of war. He is the only newcomer to the Cabinet as a result of the latest reshuffling. He does not occupy a seat in the House of Commons and, indeed, has not hitherto been actively associated with politics, although his father, the late Rt. Hon. Alfred Lyttelton, was a Conservative leader who held several important offices in former Conservative Governments. His appointment will be warmly welcomed by his many friends in the metallurgical industry.

Born in 1893 and married in 1920 to Lady Moira Godolphin Osborne, fourth daughter of the tenth Duke of Leeds, Capt. Lyttelton had a distinguished Army career before entering the world of commerce. He joined the Army at the outbreak of the last war and was continuously on active service with the Grenadier Guards from 1915 until 1918. He was mentioned in despatches three times, besides being awarded the D.S.O. and M.C.

Besides being managing director of the British Metal Corporation and a director of its subsidiaries, Capt. Lyttelton

Captain Oliver Lyttelton, D.S.O., M.C.

is also on the board of several other concerns, including Amalgamated Metal Corporation, Ltd., Ampat Tin Dredging, Ltd. (chairman), British American Tin Mines, Ltd., British (Non-Ferrous) Mining Corporation, Ltd. (chairman), British Tin Investment Corporation, Ltd. (chairman and managing director), General Tin Investments, Ltd., Imperial Smelting Corporation, Ltd., Lightalloys, Ltd. (chairman), London Tin Corporation, Ltd. (chairman), Metal Market and Exchange Co., Ltd., and Zinc Corporation, Ltd.

(The above notices are in amplification of that which was received immediately before we went to Press last week and was, unfortunately, incomplete. Ed.)

MR. A. MILLER, the official of the Astra Romana Oil Company who was recently detained by the Rumanian police, formerly lived at Renton, Dumbartonshire. He was at one time employed in the Cordale Works of the United Turkey Red Co., Ltd., but later settled in Bucharest, and had been 15 years in his present position.

OBITUARY

MR. WALTER BUTLER, proprietor of the Widnes Alkali Co., Widnes, until his retirement to Morecambe several years ago, died recently aged 75. He was for many years proprietor of the Wigan Chemical Works, at Pemberton, near Wigan, but sold that concern some 18 years ago.

MR. FRED CHAMBERS, who died recently at Chesterfield, aged 73, was director of many chemical, engineering, and colliery companies, including The Bryan Donkin Co., Ltd., the Midland Acid Co., Ltd., and the Hardwick By-Product Co., Ltd.

MR. JOHN HENRY RICHARD WHINFIELD, who died last week at Accrington, aged 84, was associated at one time with Sir Joseph Whitworth and later was with Sir W. G. Armstrong Whitworth and Co. and Vickers-Armstrong in London. He was formerly managing director of the Thames Ammunition Works, and was an expert on armament.

VISCOUNT FURNESS OF GRANTLEY, who died last Sunday at Cap Ferrat, France, aged 57, included important metallurgical appointments among his widespread commercial interests. He was chairman of the Cargo Fleet Iron Co., Ltd., the South Durham Steel and Iron Co., Ltd., and the Weardale Steel, Coke, and Coal Co., Ltd.

General News——From Week to Week

THE LONDON ESSENCE CO., LTD., have transferred their offices to Albany Road, Camberwell, London, S.E.5, and their factory to Neate Street, Camberwell, S.E.5.

QUANTITIES OF COPPER belonging to eight firms in London, Liverpool, Birmingham and Newcastle-on-Tyne and lying in various warehouses and wharves have been requisitioned by the Ministry of Supply. The prices to be paid for the copper are: Rough, £54 per ton; refined, £57 10s.; electrolytic wire bars and ingot bars, £59; and cathodes, £58 10s.

MESSRS. A. GALLENKAMP AND CO., LTD., are informing their clients that all future orders for scientific apparatus supplies should indicate the service (Admiralty, War Office, Air Ministry, Ministry of Supply, etc.) for which the apparatus is required, and where possible the priority or contract number should be quoted. In the absence of this information, an indication should be given of the kind of work for which the apparatus required will be used.

MESSRS. EDWARD ARNOLD AND CO., 41 Maddox Street, London, W.1, have just issued their current list of scientific and technical books. Industrial chemists will be specially interested in the following recent publications: "The Physical Examination of Metals, Vol. I," by B. Chalmers; "Applied Chemistry for Engineers," by E. S. Gyngell; "Boiler House and Power Station Chemistry," by Wilfrid Francis; and "Analytical Processes," by T. B. Smith.

EQUIVALENT BRITISH AND S.A.E. (Society of Automotive Engineers, U.S.A.) NICKEL ALLOY STEELS, a recent publication of the Mond Nickel Company, contains general particulars concerning the different types of steels, followed by charts showing their mechanical properties as affected by heat-treatment. It gives a very good guide to the comparison of S.A.E. steels and British steels in chemical composition, and the respective specification percentages of the more important elements are shown in three supplemental tables.

MESSRS. STERNOL, LTD., industrial oil manufacturers, have received a most heartening message from one of their customers in Ontario. "We feel sure," they say, "that the message will be of the utmost encouragement, and these sentiments, conveyed on the order that accompanies them, are so generous and sincere as to be beyond doubt the expression of sympathy and prayers for which the country as a whole will undoubtedly be grateful." And they quote the following remarks by their Canadian customer: "Knowing full well the conditions you must be operating under, we are giving you ample time to make delivery. Our sympathy and prayers go out to all you brave and courageous people. We are with you tooth and nail to the last dollar. Good luck and may God protect you all."

Foreign News

BRAZILIAN IMPORTS of chemical products, etc., in the first six months of 1940 totalled 63,000 tons, valued at £892,000, compared with 79,000 tons, valued at £969,000, during the corresponding period of 1939.

EXPORTS OF QUEBRACHO EXTRACT from the Argentine during the first eight months of 1940 totalled 89,000 tons, valued at 22,298,000 pesos, compared with 129,000 tons, valued at 26,378,000 pesos, in the corresponding period of 1939.

REUTER REPORTS FROM STOCKHOLM that soap is to be rationed in Norway. The ration will consist of one piece of toilet soap and one small box of laundry soap a person a month. Men will be allowed one shaving stick every three months. The percentage of fat in the soap will probably also be reduced.

WORK HAS BEEN STARTED in Moscow on the new building for the Institute of Organic Chemistry of the Academy of Sciences of the U.S.S.R. The building will house seven departments and will include an autoclave pavilion, and a library of 70,000 volumes. The cost of the new building is estimated at 12½ million roubles, and it is to be completed in 1942.

THE U.S. WAR DEPARTMENT has announced that a contract has been signed with the Hercules Powder Co. for the construction of a smokeless powder plant near Radford, Virginia. Construction, which will begin immediately, will require about 10 months. Production capacity will be 200,000 pounds a day, and the plant, when completed, will employ about 2500 men.

IT IS REPORTED that the Electrolytic Zinc Co. of Australasia, Ltd., intends to establish a plant for the manufacture of lithopone in South Australia in the near future. Consumption of this product in Australia totals about 3,000 tons per annum. Since the outbreak of war, the price of lithopone, which, to date, has all been imported, has risen from £23 to £40 per ton.

IMPERIAL CHEMICAL INDUSTRIES' new works at Outer Harbour, Australia, about twelve miles from Adelaide, are now in the production stage, with output undergoing a testing period. The three main products are soda ash, bicarbonate of soda and calcium chloride. When in full production, the works are expected to supply the whole of the Australian demand.

THERE HAS BEEN a notable increase in the Australian demand for barytes, which is produced in much larger quantities in South Australia than in the whole of the rest of the continent. No treatment plant is yet in operation in South Australia to remove the iron oxide stains from this mineral by means of acid, although it is known that second-grade barytes can be raised to first-grade quality by such treatment.

THE NATURAL GAS INSTITUTE of the Formosan Government-General recently completed a pilot plant in Formosa for the production of carbon black. The plant was built by the Mitsubishi Trading Co. at a cost of 480,000 yen, including the cost of equipment imported from the United States. A thermal cracking process developed by the Institute is to be used which differs in many respects from the processes utilised in the United States.

THREE HEAVY EXPLOSIONS which occurred last week at the Terrehaute (Indiana) plant of the Commercial Solvent Company, are said to have shaken the city. There were ten persons in the plant. One man was trapped and is believed to have been killed. The plant manufactures commercial alcohol and chemical products. The explosions occurred in the main building, which stands in the centre of a site of twenty acres, and were followed by a fire which gave rise to fears that further explosions might take place.

ARGENTINE CASEIN EXPORTS, which began the year rather slowly, have latterly been moving better, and on the returns for the first half-year of 1940, show a likelihood of at least maintaining the 1939 position, despite the total cessation of exports to Germany. In the first half of 1940, 1913 metric tons were despatched to the U.K., 5073 to the U.S.A., and 819 to Japan. These figures compare favourably with the corresponding figures for the whole of 1940, which were: U.K., 3213 tons; U.S.A., 7954 tons; Japan, 1002 tons. Exports to Baltic countries have fallen considerably, but the six months' total of 9796 tons is quite promising compared with last year's total of 20,565 tons.

Forthcoming Events

A MEETING OF THE LEEDS AREA LOCAL SECTION of the Chemical Society will be held in the General Lecture Theatre, The University, Leeds, on October 14, at 7.30 p.m., when a lecture entitled "The Constituents of Natural Phenolic Resins," will be delivered by Professor R. D. Haworth, D.Sc., Ph.D., F.I.C.

ON OCTOBER 21 THE BRITISH CERAMIC SOCIETY (Pottery Section) will hold a day session at the North Staffordshire Technical College, Stoke-on-Trent. The following papers will be read and discussed: (10.30 a.m.) "The Reversible Darkening in Daylight of some Glazes containing Titanium," by W. O. Williamson, B.Sc., Ph.D.; (11.15 a.m.) "The Ratio of Water to Solid Charge in Cylinder Grinding," by H. W. Webb, D.Sc., F.I.C., M.I.Chem.E., F.R.S.A., and W. E. C. Creyke; (2.15 p.m.) "The Bloating of Cornish Stone and Bodies Containing It," by H. W. Webb, D.Sc., F.I.C., M.I.Chem.E., F.R.S.A.; Discussion; (3.15 p.m.) "The Development and Use of Molochite," by A. Rigby, of English Clays Lovering Pochin and Co., Ltd.

THERE WILL BE A JOINT MEETING of the Yorkshire Section and the Food Group of the Society of Chemical Industry at Leeds University on October 28, when addresses on "The Standardisation of Tests for the Baking Industry" will be delivered by S. W. Butterworth, B.Sc., F.I.C., C. H. Fuller, B.Sc., A.I.C., H. C. Freeman, A.I.C., and W. P. Ford, M.A., A.I.C. Further details will be announced later.

Weekly Prices of British Chemical Products

THE industrial chemical market throughout displays a very even tone and a steady volume of new business is reported as well as a fair weight of export inquiry. In the potash section bichromate and yellow prussiate continue in limited supply and available quantities of carbonate and caustic are quickly absorbed. Among the soda products caustic, perborate and prussiate are in fair request and there is an active demand for chlorate of soda. Values in nearly all directions are strong but there are few actual changes to record in quoted rates. Convention quotations for white lead have been advanced by £1 per ton owing to higher manufacturing costs, but the schedule of prices for red lead is unaltered. Makers' prices for tartaric acid and cream of tartar are firmer with available supplies reserved for regular consumer customers. Conditions in the market for coal tar products show little change compared with last week. Cresylic acid and crude carbolic are both a shade less firm in quotation and recent values for pyridines are just about held. A fair demand is circulating for creosote and naphtha.

MANCHESTER.—Quotations on the Manchester chemical market during the past week have pretty well throughout the range maintained a stable front, with the underlying tendency firm in almost all sections. The demand for textile chemicals, for both the cotton and woollen trades, has been on fairly active lines, with the movement of supplies chiefly against contracts already held, while specifications for most other industrial users have been reasonably satisfactory. Fresh bookings this week have been on a moderate scale, the bulk of the transactions being in connection with spot and early deliveries. Among the coal-tar products renewed weakness has occurred in cresylic acid, the demand for which remains disappointing.

GLASGOW.—The slight improvement in the Scottish heavy chemical trade reported last week has been maintained, and prices remain firm. The export business, however, is rather quiet.

Price Changes

Rises: Benzol; Cream of Tartar; Lead (White); Nitrogen Fertilisers; Sodium Sulphite.

Falls: Cresylic Acid (London and Manchester); Pyridine.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton £36 10s.; 10 cwt./1 ton, £37 10s.; 4/10 cwt., £38 10s.; 80% pure, 1 ton, £38 10s.; 10 cwt./1 ton, £39 10s.; 4/10 cwt., £40 10s.; commercial glacial, 1 ton, £46; 10 cwt./1 ton, £47; 4/10 cwt., £48; delivered buyers' premises in returnable barrels. £4 per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 50 tons and over, £52 10s.; 10/50 tons, £53; 5/10 tons, £53 10s.; 1/5 tons, £54; single drums, £55, delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each; delivered in containers of less than 45 gallons but not less than 10 gallons £10 10s. per ton in excess of maximum prices; delivered in containers less than 10 gallons each £10 10s. per ton in excess of maximum prices, plus a reasonable allowance.

Alum.—Loose lump, £9 10s. per ton, d/d, nominal.

Aluminium Sulphate.—£8 to £8 10s. per ton d/d.

Ammonia Anhydrous.—99.95%, 1s. to 2s. per lb., according to quantity in loaned cylinders, carriage paid; less for important contracts.

Ammonium Carbonate.—£32 to £36 per ton d/d in 5 cwt. casks.

Ammonium Chloride.—Grey galvanising, £18 per ton, in casks, ex wharf. See also Salammoniac.

Antimony Oxide.—£68 per ton.

Arsenic.—99/100%, about £30 per ton, ex store.

Barium Chloride—98/100%, prime white crystals, £11 10s. 0d. to £13 per ton, bag packing, ex works; imported material would be dearer.

Bleaching Powder.—Spot, 35/37%, £9 10s. to £10 per ton in casks, special terms for contract.

Borax, Commercial.—Granulated, £23; crystals, £24; powdered, £24 10s.; extra fine powder, £25 10s.; B.P. crystals, £32; powdered, £32 10s.; extra fine, £33 10s. per ton for ton lots, in free 1 cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £68; powder, £69 per ton in tin-lined cases for home trade only, packages free, carriage paid in Great Britain.

Boric Acid.—Commercial, granulated, £37 10s.; crystals, £38 10s.; powdered, £39 10s.; extra fine, £41 10s.; large flakes, £50; B.P. crystals, £46 10s.; powdered, £47 10s.; extra fine powdered, £49 10s. per ton for ton lots in free 1-cwt. bags, carriage paid in Great Britain.

Calcium Bisulphite.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/75% solid, £5 10s. per ton ex store.

Charcoal Lump.—£10 10s. to £14 per ton, ex wharf. Granulated, supplies scarce.

Chlorine, Liquid.—£19 15s. per ton, d/d in 16/17 cwt. drums (3-drum lots); 4½d. per lb. d/d station in single 70-lb. cylinders.

Chrometan.—Crystals, 4½d. per lb.; liquor, £19 10s. per ton d/d station in drums. GLASGOW: Crystals 4d. per lb. in original barrels.

Chromic Acid.—1s. 2d. per lb., less 2½%; d/d U.K. GLASGOW: 1s. 0¼d. per lb. for 1 cwt. lots.

Citric Acid.—1s. 2d. per lb. MANCHESTER: 1s. 6d.

Copper Sulphate.—About £29 10s. per ton f.o.b. MANCHESTER: £28 10s., less 2 %, in 5 cwt. casks f.o.b. Liverpool.

Cream of Tartar.—100%, £11 7s. per cwt., less 2½%, d/d in sellers' returnable casks.

Formaldehyde.—MANCHESTER: 40%, £24 to £25 per ton in casks d/d; imported material dearer.

Formic Acid.—85%, £44 10s. per ton for ton lots, carriage paid, carboys returnable; smaller parcels quoted at 46s. 6d. to 49s. 6d. per cwt., ex store.

Glycerine.—Chemically pure, double distilled, 1,260 s.g., in tins, £3 10s. to £4 10s. per cwt. according to quantity; in drums, £3 2s. 6d. to £3 16s. 0d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, 1s. 4d. per lb.; free-running crystals are quoted at 1s. 7½d. to 1s. 10½d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 6s. 1½d. to 8s. 7½d. carboy d/d according to purity, strength and locality.

Iodine.—Resublimed B.P., 9s. 2d. to 13s. per lb., according to quantity.

Lactic Acid.—Dark tech., 50% by vol., £31 per ton; 50% by weight, £38; 80% by weight, £67; pale tech., 50% by vol., £39 10s.; 50% by weight, £46, 80% by weight, £74. Not less than one ton lots ex works; barrels returnable, carriage paid.

Lead Acetate.—White, £46 10s. to £48 10s. ton lots.

Lead Nitrate.—About £45 per ton d/d in casks.

Lead, Red.—English, 5/10 cwt. £42; 10 cwt. to 1 ton, £41 15s.; 1/2 tons, £41 10s.; 2/5 tons, £41; 5/20 tons, £40 10s.; 20/100 tons, £40; over 100 tons, £39 10s. per ton, less 2½ per cent. carriage paid; non-setting red lead 10s. per ton dearer in each case. Continental material £1 per ton cheaper.

Lead, White.—Dry English, less than 5 tons, £52 10s.; 5/15 tons, £48 10s.; 15/25 tons, £48; 25/50 tons, £47 10s.; 50/200 tons, £47 per ton less 5 per cent. carriage paid; Continental material £1 per ton cheaper. Ground in oil, English, 1/5 cwt., £61; 5/10 cwt., £60; 10 cwt. to 1 ton, £59 10s.; 1/2 tons, £58; 2/5 tons, £57; 5/10 tons, £55; 10/15 tons, £54; 15/25 tons, £53 10s.; 25/50 tons, £53; 50/100 tons, £52 10s. per ton less 5 per cent. carriage paid. Continental material £2 per ton cheaper.

Litharge.—1 to 2 tons, £41 10s. per ton.

Lithium Carbonate.—7s. per lb. net.

Magnesite.—Calcined, in bags, ex works, £14 to £17 per ton

Magnesium Chloride.—Solid (ex wharf), £12 to £13 per ton. MANCHESTER: £12 10s. to £13.

Magnesium Sulphate.—Commercial, £10 to £12 per ton, according to quality, ex works.

Mercury Products.—Controlled price for 1 cwt. quantities: Bichloride powder, 12s. 3d.; bichloride lump, 12s. 10d.; ammon. chloride powder, 14s. 2d.; ammon. chloride lump, 14s.; mercurous chloride, 14s. 7d.; mercury oxide, red cryst., B.P., 16s. 4d.; red levig. B.P., 15s. 10d.; yellow levig. B.P. 15s. 9d.

Methylated Spirit.—Industrial 66 O.P. 100 gals., 2s. 0½d. per gal.; pyridinised 64 O.P. 100 gals., 2s. 1½d. per gal.

Nitric Acid.—S.G. 1420, £28 10s. to £29 10s. per ton ex works.

Oxalic Acid.—From £59 5s. per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels would be dearer; deliveries slow.

Paraffin Wax.—Nominal.

Potash, Caustic.—Solid, 88/92%, commercial grade, £53 7s. 6d. per ton, c.i.f. U.K. port, duty paid.

Potassium Bichromate.—Crystals and granular 6d. per lb.; ground, 7d. per lb., carriage paid. MANCHESTER and GLASGOW: 6d. per lb. in orig. casks.

Potassium Carbonate.—Hydrated, 83/85%, £46 17s. 6d. per ton; calcined, 98/100%, £52 2s. 6d. per ton, c.i.f. U.K. port.

Potassium Chlorate.—Imported powder and crystals, ex store London, 10d. to 1s. per lb.

Potassium Iodide.—B.P., 8s. to 11s. 2d. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, £26 to £30 per ton ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 4½d. to 1s. 5½d. per lb.; commercial, £7 9s. 6d. to £8 1s. 6d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, about 1s. 2d. to 1s. 5d. per lb., supplies scarce.

Salammoniac.—Dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £16 10s. per ton, in casks, ex store.

Soda, Caustic.—Solid, 76/77% spot, £14 10s. per ton d/d station.

Soda Crystals.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

Sodium Acetate.—£37 to £40 per ton, ex wharf.

Sodium Bicarbonate.—About £10 10s. to £11 10s. per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 5d. per lb., anhydrous, 6d. per lb. net d/d U.K. MANCHESTER and GLASGOW: 5d. per lb., in orig. casks.

Sodium Bisulphite Powder.—60/62%, £16 per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£34 to £43 per ton, d/d, according to quantity.

Sodium Hyposulphite.—Pea crystals, £17 15s. per ton for 2-ton lots; commercial, £13 10s. per ton. MANCHESTER: Commercial, £13 10s.; photographic, £17 10s.

Sodium Iodide.—B.P., for not less than 28 lb., 8s. 10d. per lb.; for not less than 7 lb., 10s. 9d. per lb.

Sodium Metasilicate.—£14 5s. per ton, d/d U.K., in cwt. bags.

Sodium Nitrate.—Refined, £10 to £11 per ton for 6-ton lots d/d.

Sodium Nitrite.—£20 per ton for ton lots.

Sodium Perborate.—10%, £4 12s. 6d. per cwt. d/d in 1-cwt. drums.

Sodium Phosphate.—Di-sodium, £17 per ton, delivered, for ton lots. Tri-sodium, £20 to £21 per ton d/d for ton lots.

Sodium Prussiate.—From 6¾d. per lb. ex store.

Sodium Silicate.—£9 15s. per ton, for 4-ton lots.

Sodium Sulphate (Glauber Salts).—£4 10s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground, Spot £4 3s. 6d. per ton d/d station in bulk. MANCHESTER: £4 5s.

Sodium Sulphide.—Solid 60/62%, Spot, £14 10s. per ton d/d in drums; crystals, 30/32%, £10 5s. per ton d/d in casks.

Sodium Sulphite.—Pea crystals, spot, £16 10s. per ton d/d station in kegs; commercial, £11 15s. per ton d/d station in bags.

Sulphur.—Finely powdered, £17 to £18 per ton d/d; precip. B.P., £3 9s. per cwt.

Sulphuric Acid.—168° Tw., £6 2s. 3d. to £6 13s. 3d. per ton; 140° Tw., arsenic-free, £4 7s. 6d. to £4 17s. 6d. per ton; 140° Tw. arsenious, £4 per ton; quotations naked at sellers' works.

Tartaric Acid.—2s. 8½d. per lb., less 5%, carriage paid for lots of 5 cwt. and upwards. Makers' prices nominal; imported material 2s. 3d. to 2s. 6d. per lb., ex wharf. MANCHESTER: 2s. 6d. per lb.

Zinc Oxide.—Maximum prices: White seal, £30 17s. 6d. per ton; red seal, £28 7s. 6d. d/d; green seal, £29 17s. 6d. d/d buyers' premises.

Zinc Sulphate.—Tech., about £25, carriage paid, casks free.

Rubber Chemicals

Antimony Sulphide.—Golden, 9½d. to 1s. 7d. per lb., according to quality. Crimson, 1s. 8d. to 2s. per lb.

Arsenic Sulphide.—Yellow, 1s. 9½d. per lb.

Barytes.—Best white bleached, £6 13s. 6d. per ton.

Cadmium Sulphide.—5s. 5d. to 6s. 6d. per lb.

Carbon Black.—5d. to 7⅞d. per lb., according to packing.

Carbon Bisulphide.—£32 5s. to £37 5s. per ton, according to quantity, in free returnable drums.

Carbon Tetrachloride.—£46 to £49 per ton.

Chromium Oxide.—Green, 1s. 6d. per lb.

India-rubber Substitutes.—White, 6¾d. to 8½d. per lb.; dark 5½d. to 6d. per lb.

Lithopone.—30%, £25 per ton; 60%, £31 to £32 per ton. Imported material would be dearer.

Mineral Black.—£10 to £14 per ton.

Mineral Rubber, "Rupron."—£16 to £18 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£30 to £55 per ton, d/d, according to quality.

Vermilion.—Pale or deep, 14s. 6d. per lb., for 7 lb. lots and less. Plus 5% War Charge.

Nitrogen Fertilisers

Ammonium Phosphate Fertilisers.—Type A, £20 4s. 3d., B, £14 11s. 6d., C, £17 17s. 3d. per ton in 6-ton lots, October delivery, d/d farmer's nearest station.

Ammonium Sulphate.—£9 14s. 6d. per ton in 6-ton lots, October delivery, d/d farmer's nearest station.

Calcium Cyanimide.—Nominal; supplies very scanty.

Concentrated Complete Fertilisers.—£14 17s. 6d. to £15 17s. 6d. per ton in 6-ton lots, October delivery, d/d farmer's nearest station; supplies small.

"Nitro-Chalk."—£9 14s. per ton in 6-ton lots, October delivery, d/d farmer's nearest station.

Sodium Nitrate.—Chilean, £10 14s. per ton in 2-cwt. bags, October delivery, d/d farmer's nearest station.

Coal Tar Products

Benzol.—Industrial (containing less than 2% of toluol), 2s. to 2s. 2d. per gal., ex works.

Carbolic Acid.—Crystals, 9½d. to 10¾d. per lb.; Crude, 60's 3s. 6d. to 4s., according to specification. MANCHESTER: Crystals, 10½d. per lb., d/d; crude, 3s. 9d. to 4s. naked at works.

Creosote.—Home trade, 5½d. to 6d. per gal., f.o.r., makers' works; exports 6d. to 6¼d. per gal., according to grade. MANCHESTER: 5d. to 7d. per gal.

Cresylic Acid.—Pale, 99/100%, 2s. 3d. per gal. MANCHESTER: Pale, 99/100%, 2s. 2d. per gal.

Naphtha.—Solvent, 90/160°, 1s. 11d. to 2s. 1d. per gal.; Heavy 90/190°, 1s. 7d. to 1s. 8d. naked at works. MANCHESTER: 90/160° 1s. 11d. to 2s.

Naphthalene.—Crude, whizzed or hot pressed, £14 per ton; purified crystals, £27 per ton in 2-cwt. bags; flaked, £27 per ton. Fire-lighter quality, £6 to £7 per ton ex works. MANCHESTER: Refined, £26 per ton.

Pitch.—Medium, soft, 50s. per ton (nominal) f.o.b. MANCHESTER: Nominal.

Pyridine.—90/140°, 18s. 6d. per gal.; 90/160°, 16s.; 90/180°, 4s. to 5s. per gal., f.o.b. MANCHESTER: 16s. 6d. to 20s. per gal.

Toluol.—Pure, 2s. 5d., nominal. MANCHESTER: Pure, 2s. 5d. per gal., naked.

Xylol.—Commercial, 2s. 9d. per gal.; pure, 2s. 11d. MANCHESTER: 2s. 11d. per gal.

Wood Distillation Products

Calcium Acetate.—Brown, £8 10s. to £10 per ton; grey, £13 to £14. MANCHESTER: Grey: £20.

Methyl Acetone.—40.50%, £42-£45 per ton.

Wood Creosote.—Unrefined, 2s. per gal., according to boiling range.

Wood Naphtha, Miscible.—4s. 6d. to 5s. per gal.; solvent, 5s. per gal.

Wood Tar.—£5 to £6 per ton, according to quality.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-**Cresol** 30/31° C.—8d. to 9d. per lb. in ton lots.

p-**Cresol** 34/35° C.—1s. 8d. to 1s. 9d. per lb. in ton lots.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb.; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb., in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—October 10.—For the period ending November 2 per ton, net, naked, ex mill, works or refinery, and subject to additional charges according to package and location of supplies:—LINSEED OIL, raw, £41 10s. RAPESEED OIL, crude, £44. COTTONSEED OIL, crude, £31 2s. 6d.; washed, £34 5s.; refined edible, £35 12s. 6d.; refined deodorised, £36 10s. SOYA BEAN OIL, crude, £33; refined deodorised, £37. COCONUT OIL, crude, £28 2s. 6d.; refined deodorised, £31 7s. 6d. PALM KERNEL OIL, crude, £27 10s.; refined deodorised, £30 15s. PALM OIL, refined deodorised, £33. GROUNDNUT OIL, crude, £35 10s.; refined deodorised, £40. WHALE OIL, crude hardened, 42 deg., £30 10s.; refined hardened, 42 deg., £33. ACID OILS.—Groundnut, £19; soya, £17; coconut and palm kernel, £22 10s. ROSIN, 25s. to 32s. 6d. per cwt., ex wharf, according to grade. TURPENTINE, 55s. per cwt., spot, American, including tax, ex wharf, barrels, and ex discount.

HULL.—October 9.—American turpentine, spot, 57s. per cwt. in barrels, ex store.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

A. JOHN SIMMONDS, LTD, London, S.W., oil and colourmen. (M., 12/10/40.) Sept. 27, £1,850 debenture, to A. J. Simmonds, East Sheen; general charge. *£4,500. October 30, 1939.

FREDK. E. GILLETT, LTD., London, S.W., oil and colour merchants, etc. (M., 12/10/40.) Sept. 17, £250 mortgage to C. J. Price, London; charged on a contract. *Nil. May 5, 1939.

HORNFLOWA, LTD., London, E.C., manufacturers of plastic powders. (M., 12/10/40.) Aug. 21, agreement to create a mortgage securing to H.M. Treasury Solicitor and Special Areas Reconstruction Association, Ltd., £20,000; charged on lands and factory buildings, etc., at Maryport, also general charge; also Sept. 12, £15,000 debenture, to H.M. Treasury Solicitor and £5,000 debenture, to Special Areas Reconstruction Association, Ltd.; general charges. *Nil. Dec. 27, 1939.

County Court Judgments

DELLWOOD, LTD., R/O, Aylmer Road, E.11, manufacturing chemists, (C.C.J., 12/10/40.) £43 12s. 9d. August 1.

CURWEN-MILLER, LTD., R/O, 40 Newfoundland Street, Bristol, paint manufacturers and merchants. (C.C.J., 12/10/40.) £25 5s. 2d. August 30.

Companies Winding-Up

MILFORD PRODUCTS COMPANY, LTD. (C.W.U.V. 12/10/40). Creditors 30th day of October, 1940, debts or claims to Percy Cardwell (Poppleton and Appleby); 1 George Street, Sheffield 1, by October 30.

Company News

British Celanese, Ltd., have declared a half-year's dividend on the 7 per cent. first cumulative preference shares, payable October 31.

Messrs. A. Boake, Roberts and Co., Ltd., have declared an interim dividend of 1½ per cent., tax free, for the year ending March 31, 1941. (2 per cent., tax free, paid at this time last year.)

The **John Thompson Engineering Co., Ltd.**, has declared an interim dividend of 5 per cent. on the ordinary shares for the year ending December 31, 1940, payable, less tax, on November 1 (last year the same).

The directors of the **United Molasses Company, Ltd.**, have declared an interim dividend on the ordinary stock of 7½ per cent. actual, equal to 6d. gross per unit of 6s. 8d., less tax, for the year ending December 31, 1940.

The directors of the **Manganese Bronze & Brass Co., Ltd.**, have decided to defer consideration of a dividend on the ordinary shares until the full year's results are known. Profit for the year to date, however, compares favourably with last year. The usual half-yearly dividend is to be paid on the 7½ per cent. non-cumulative preference shares.

The directors of **Lever Brothers & Unilever, Ltd.**, it is learned in financial quarters, have no intention of making any appropriations to reserve for the payment of the various preference share issues of Lever Brothers & Unilever, N.V. They are understood to feel that, since the alleged profits of the Dutch company for the current period are more than enough to enable the usual guilder dividend to be paid, and that any postponement of its distribution must be due to purely financial reasons due to the German occupation of the Netherlands, it is hardly to be expected of them that they should penalise shareholders of the English company for a situation beyond their control.

Chemical Trade Inquiries

South Africa.—H.M. Trade Commissioner at Johannesburg reports that the South African Railways and Harbours Administration is calling for tenders (Tender No. 2880) for the supply and delivery of quantities of dry red and white lead. Tenders, endorsed "Tender No. 2880 Dry Red and White Lead," should be addressed to the Chief Stores Superintendent, Purchase Section, Room 3, Park Chambers, Rissik Street, Johannesburg, by whom they will be received up to 3 p.m. on October 25. (Ref. T. 21798/40.)

Chemical and Allied Stocks and Shares

THE general trend on the Stock Exchange has been governed by views current in the City in regard to the war news, and values in most sections have been marked up, although no material increase in the volume of business was in evidence. The improvement in prices was fairly widespread, and numerous shares of companies associated with the chemical and kindred industries moved in favour of holders.

Imperial Chemical, which were 26s. 6d. a week ago, have since moved up to 27s. 7½d. while the 7 per cent. preference units were 9d. better at 28s. 9d. Moreover, Dunlop Rubber rose to 30s. 6d. and British Oxygen further advanced to 62s. 6d., while Turner & Newall appreciated to 60s. 7½d. Shares of companies manufacturing cement and kindred products were again better, with Associated Cement 60s., Tunnel Cement 31s. 3d., and British Plaster Board 11s. 9d. Results of Wall Paper Manufacturers showing an improved rate of profit were in excess of general market estimates and the deferred units were very firm at 18s. 1½d., a rise of 3s. 9d. Elsewhere, International Paint were firm at 65s., and Pinchin Johnson at 19s. Declaration of the interim dividend of the last-named company is now due. United Molasses moved up to 21s. 6d. on the interim payment, which has increased hopes that the total dividend for the year may also be maintained. Fison Packard were around 29s.; the financial results are expected in a few weeks. Lever & Unilever were better at 22s. 3d. in accordance with the general tendency, and although "ex" the dividend, Murex ordinary shares made the higher price of 67s. 6d. Triplex Glass were better at 15s. 9d.

In other directions, Lawes Chemical shares transferred at 6s. at one time, and Sanitas Trust ordinary at 13s. 9d., while British Drug Houses changed hands up to the better level of 22s. and various markings of business were also shown in Morgan Crucible preference units. B. Laporte remained around 50s., pending declaration of the interim dividend. Further improvement to close on 10s. was shown in Imperial Smelting; the annual results fall to be issued in a few weeks. Greeff-Chemicals 5s. shares remained around par, and Blythe Colour 4s. shares were also at 5s., while William Blythe 3s. shares were around 5s. 3d. though quotations did not appear to be tested adequately by business. Iron and steel securities benefited from the better tendency on the Stock Exchange, but as in most other directions, very little improvement in business was shown. Dorman Long further improved to 18s. 3d. on hopes that the forthcoming results might show the maintenance of the dividend. Moreover, United Steel were 17s. 10½d., Stewarts & Lloyds 37s. 6d., and Tube Investments 81s. 6d. Among other shares, General Refractories were 6s. 4½d. and an improved price was made by Goodlass Wall. Borax Consolidated deferred remained at 25s. 7½d., but Barry & Staines moved up on hopes that the interim payment might be maintained. Nairn & Greenwich remained around 38s. 9d. Textile securities were also better, with Courtaulds 29s. 9d. and British Celanese second preference 12s. Results of the last-named company are expected next month.

Boots Drug were 40s. 6d., Beechams Pills 2s. 6d., deferred 8s. 6d., and Timothy Whites 17s., while the ordinary units of the Distillers Co. made the higher price of 56s. 3d. Sangers ordinary shares remained around 18s. British Oil & Cake Mills at 32s. 6d. were also unchanged on balance, and Griffiths Hughes were again 7s., while Monsanto Chemicals preference shares were quoted at 21s. 3d. Movements in oil shares were small, but mostly in favour of holders, and "Shell" were 36s. 3d.

New Companies Registered

Loganite Fuels (Liquid), Ltd. (363,436) Private company. Nominal capital £100 in 200 shares of 10s. each. Objects: Chemical manufacturers and manufacturers of and dealers in chemical compounds of all kinds, particularly for the treatment of liquid fuels, etc. Directors: Robt. W. Gunson, Arthur H. Dwight. The registered office is at 124/8 Grand Buildings, Trafalgar Square, W.C.2. The following companies have also been registered with objects, directors and registered offices similar to above: **Loganite Products, Ltd.** (363,438). Capital: £100 in 10s. shares; **Loganite Solvents Co., Ltd.** (363,439). Capital: £100 in 10s. shares; **Loganite (Holdings), Ltd.** (363,343). Nominal capital: £100 in 1000 shares of 2s. each.

English Earth Colours, Ltd. (363,479).—Private company. Capital, £1000 to 4000 shares of 5s. each. Prospectors, quarrymen, miners, manufacturers of ochres and dealers in crude and manufactured earths, ochres, oxides, stone stronta, clay, iron ore, tin, lead, copper, manganese, coal and other ores, metals and minerals, manufacturers of and dealers in colours, dyes and intermediates, fillers, paints, varnishes, chemicals, drugs, wood and bone extracts and other like preparations, smelters, lime burners, etc. Directors: Charles M. Beavis, The Barton, Bristol; Albert H. Orchard, Robert C. Bayldon, Lt.-Col. Owen H. Bayldon, Norman S. Kinnersley. Secretary: J. L. Thomas.